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CYCLOSPORIASIS

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Cyclospora were described in 1870 by Eimer. Various species of cyclospora were found in snakes, myriapods and rodents. The first human cases were described by Ashford in three individuals living in Papua-New Guinea. Since then it was isolated in many countries but it was not until 1993 that it found its final taxonomic place as the genus cyclospora. Until 1996 most of the documented cases of cyclosporiasis in North America were in overseas travelers.

Cyclospora infection is caused by a protozoan parasite (*Cyclospora cayetanensis*) transmitted by food or water that is contaminated with infected stool.

Epidemiology

Infection occurs after the host ingest oocysts. This is the result of fecal contamination. The source of oocysts may be human or animal. Several animals (chickens, ducks, non-human primates) harbor cyclospora but their role has not yet been determined.

Cyclospora requires time outside the host for sporulation to occur; thus human to human transmission is not likely. The oocysts excreted by humans are not infectious. The time required in nature for sporulation to occur is not yet known, under laboratory conditions, it takes about 2 weeks.

Waterborne outbreaks are frequent. Consumption of untreated water is a risk factor for travelers found infected with cyclospora. The first outbreak described in the USA was linked to tap water in a physicians' dormitory. In an outbreak in a British military detachment in Nepal cyclospora oocysts were found in the water supply, a mixture of river and municipal water that had acceptable residual concentration of chlorine. Cyclospora are highly resistant to chlorine disinfection.

Foodborne outbreaks were linked to raspberries, mezclun lettuce and basil.

There are no community based studies to determine the prevalence of cyclosporiasis in endemic countries. Surveys of laboratory stool specimens in the USA show a low prevalence: 0.5% of specimens examined.

Outbreaks tend to be seasonal, occurring more often in warmer months

The average incubation period for cyclosporiasis is 1 week; in some outbreaks it was as short a 24 hrs.

Clinical Description

Cyclospora is an intracellular parasite in the enterocytes of the upper small bowel. There are some inflammatory changes, villous atrophy and crypt hyperplasia in the jejunal tissue of infected individuals.

Patients have diarrhea, abdominal cramps, nausea, fatigue, loss of appetite, eventually weight loss. The diarrhea is watery without blood or inflammatory cells. It often follows a cyclical pattern. Vomiting and fever are uncommon.

The infection is self-limited. In patients who are not treated with trimethoprim-sulfamethoxazole, illness can be protracted, lasting for a few weeks with remitting and relapsing symptoms. In some of these cases fatigue and weight loss may occur.

In immunocompromised individuals, the infection is severe with a high recurrence rate.

Some individuals have contracted the infection more than once within a few months, therefore acquired immunity is not totally protective.

Laboratory Tests

The diagnosis is based on the demonstration of oocysts in the stools, duodenal, jejunal aspirates or biopsy specimens. The microorganisms are detected at the microscopic examination of a wet mount of fresh stools. Cyclospora is diagnosed by the identification of 8-9 mm 'wrinkled spheres'. on a wet mount slide (from a stool sample). The spheres resemble large oocysts of cryptosporidium. This is a special laboratory test that is not routinely done and so must be specifically requested.

Health-care providers should consider the diagnosis of Cyclospora infection in persons with prolonged diarrheal illness and specifically request testing of stool specimens for this parasite.

Surveillance

Cyclosporiasis is a reportable disease with reporting required within 5 business days.

Case Definition

Clinical description
An illness of variable severity caused by the protozoan *Cyclospora cayetanensis* and commonly characterized by watery diarrhea, loss of appetite, weight loss, abdominal bloating and cramping, increased flatus, nausea, fatigue, and low-grade fever. Vomiting also may be noted. Relapses and asymptomatic infections can occur.

Laboratory criteria for diagnosis

Laboratory-confirmed cyclosporiasis is defined as the detection—in symptomatic or asymptomatic persons—of *Cyclospora*
- oocysts in stool by microscopic examination, or
- in intestinal fluid or small bowel biopsy specimens, or
- demonstration of sporulation, or
- DNA (by polymerase chain reaction) in stool, duodenal/jejunal aspirates or small bowel biopsy specimens.

Case classification

Confirmed, symptomatic: a laboratory-confirmed case associated with one of the symptoms described above
Confirmed, asymptomatic: a laboratory-confirmed case associated with none of the above symptoms

Intervention

The purpose of investigation is to identify cases, to differentiate with other infections that cause diarrhea, to identify the source(s) of illness, and to institute disease control measures to prevent further spread of the disease.

- Upon receipt of a report of a case of cyclospora, contact the physician and/or hospital to confirm the diagnosis.
- It is not necessary to follow-up on each individual, isolated case of cyclospora; only when it is thought to be part of a food or waterborne outbreak.
- If the case is suspected to be part of an outbreak, the first concern should be to determine the source(s) of the infection. Check recent food history and water sources or other common exposures.
- Since Cyclospora needs days or weeks after being passed in a bowel movement to become infectious, it is unlikely that it is passed directly from one person to another and contact investigation is not useful.

Case Management - Treatment

The drug of choice is trimethoprim-sulfamethoxazole (160/800mg) bid for 7 days. In immuno-compromised patients a dose of 160/800 mg qid for 10 days is recommended. Most standard treatment of gastroenteritis agents are ineffective: quinolones, quinacrine, tinidazole, metronidazole and macrolides.

Prevention

Avoid food contamination: Produce should be washed thoroughly before it is eaten; However, this practice does not eliminate the risk for transmission of Cyclospora .

Food handlers: Therefore, food workers should be particularly meticulous about handwashing.

Public waters**:** To reduce the risk for Cyclospora contamination of fountains, and pools, the following measures may be useful: showering before entering the fountain, excluding persons with diarrhea or incontinence, excluding children wearing diapers, and restricting food consumption in the fountain area. Exclusion of persons from decorative water displays not designed for interactive use should be instituted and enforced.

For recreational water facilities designed for human use, improved filtration may reduce risk.

Hospital precaution and isolation: Standard precautions